

## CLAIMS

What is claimed is:

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A1<sup>5</sup>
1. A modular I-beam comprising:
    - a. a first set of nested channels;
    - b. a second set of nested channels disposed in back-to-back relation with said first set of nested channels; and
    - c. one or more fasteners securing said first and second sets of nested channels together.
  2. The modular I-beam of claim 1 wherein said first and second sets of nested channels comprise at least one channel pair.
  3. The modular I-beam of claim 2 wherein each said channel pair comprises an outer channel and an inner channel, said outer and inner channels each comprising a top flange, a bottom flange, and a central web connecting said top and bottom flanges.
  4. The modular I-beam of claim 3 wherein said top flange of each said outer channel includes an outer end portion that angles inwardly towards a midline of said channel.
  5. The modular I-beam of claim 4 wherein said bottom flange of each said outer channel includes an outer end portion that angles inwardly towards a midline of said channel.

6. The modular I-beam of claim 4 wherein said top flange of each said inner channel includes an outer end portion that angles inwardly towards a midline of said channel.

7. The modular I-beam of claim 6 wherein said bottom flange of each said inner channel  
5 includes an outer end portion that angles inwardly towards a midline of said channel.

8. The modular I-beam of claim 6 wherein the angle of inclination of said outer end of said inner channel is greater than the angle of inclination of said outer end of said outer channel.

9. The modular I-beam of claim 3 wherein said top and bottom flanges of said inner channels angle outwardly away from a midline of said channel to engage said top and bottom flanges respectively of said outer channel.

10. The modular I-beam of claim 2 wherein said first and second sets of channels each  
15 comprise at least two pairs of channels.

11. The modular I-beam of claim 1 further comprising a central beam disposed between said first and second sets of channels.

20 12. The modular I-beam of claim 11 wherein said fasteners comprise nails that pass through said channels into said central beam.

13. The modular I-beam of claim 1 wherein said channels in said first set of channels include one or more aligned openings to receive said fasteners.

14. The modular I-beam of claim 13 wherein said channels in said second set of channels  
5 include one or more aligned openings to receive said fasteners.

15. The modular I-beam of claim 14 wherein said fasteners comprise threaded fasteners that pass through said aligned openings in said first and second sets of channels.

16. The modular I-beam of claim 14 wherein said openings in said first set of channels align  
10 with said openings in said second set of channels.

17. The modular I-beam of claim 1 wherein at least one channel in each set of nested  
15 channels includes a top flange with an outer end portion that angles inwardly toward a midline of said channel.

18. The modular I-beam of claim 17 wherein the outermost channel in each set of nested  
channels includes a top flange with an outer end portion that angles inwardly toward a midline of  
said channel.

19. The modular I-beam of claim 1 including at least one plate for permitting joists to be  
20 flush mounted to the modular I-beam.

20. The modular I-beam of claim 1 including at least one closure channel extending at least partially around one of said first and second sets of nested channels.

21. The modular I-beam of claim 20 wherein the closure channel includes an outer face plate  
5 for permitting joists to be flush-connected thereto.

22. The modular I-beam of claim 20 wherein the closure channel includes an outer face plate and upper and lower plates with the upper and lower plates being connected at generally top and bottom areas of the I-beam.

23. The modular I-beam of claim 22 further comprising a central beam disposed between said first and second sets of channels and wherein the upper and lower plates of the closure channel are secured to the central beam.

24. A modular I-beam comprising:

- a) a central beam;
- b) a first set of nested channels disposed on one side of said central beam;
- c) a second set of nested channels disposed on a second side of said central beam and oriented in a direction opposite said first set of nested channels; and
- d) one or more fasteners securing said first and second sets of nested channels to said central beam.

25. The modular I-beam of claim 24 wherein said first and second sets of nested channels comprise at least one channel pair.

26. The modular I-beam of claim 25 wherein each said channel pair comprises an outer  
5 channel and an inner channel, said outer and inner channels each comprising a top flange, a bottom flange, and a central web connecting said top and bottom flanges.

27. The modular I-beam of claim 26 wherein said top flange of each said outer channel includes an outer end portion that angles inwardly towards a midline of said channel.

28. The modular I-beam of claim 27 wherein said bottom flange of each said outer channel includes an outer end portion that angles inwardly towards a midline of said channel.

29. The modular I-beam of claim 27 wherein said top flange of each said inner channel includes an outer end portion that angles inwardly towards a midline of said channel.

30. The modular I-beam of claim 29 wherein said bottom flange of each said inner channel includes an outer end portion that angles inwardly towards a midline of said channel.

31. The modular I-beam of claim 29 wherein the angle of inclination of said outer end of said  
20 inner channel is greater than the angle of inclination of said outer end of said outer channel.

32. The modular I-beam of claim 26 wherein said top and bottom flanges of said inner channels angle outwardly away from a midline of said channel to engage said top and bottom flanges respectively of said outer channel.

5 33. The modular I-beam of claim 25 wherein said first and second sets of channels each comprise at least two pairs of channels.

34. The modular I-beam of claim 24 wherein said channels in said first set of channels include one or more aligned openings to receive said fasteners.

35. The modular I-beam of claim 34 wherein said channels in said second set of channels include one or more aligned openings to receive said fasteners.

36. The modular I-beam of claim 35 wherein said openings in said first set of channels align with said openings in said second set of channels.

37. The modular I-beam of claim 24 wherein said fasteners comprise threaded fasteners that pass through said aligned openings in said first and second sets of channels.

20 38. The modular I-beam of claim 24 wherein said fasteners comprise nails that pass through said channels into said central beam.

39. The modular I-beam of claim 24 wherein at least one channel in each set of nested channels includes a top flange with an outer end portion that angles inwardly toward a midline of said channel.

5 40. The modular I-beam of claim 39 wherein the outermost channel in each set of nested channels includes a top flange with an outer end portion that angles inwardly toward a midline of said channel.

41. The modular I-beam of claim 24 including at least one plate for permitting joists to be flush-mounted to the modular I-beam.

42. The modular I-beam of claim 41 wherein the plate forms a part of a closure panel that extends at least partially around one of said first and second sets of nested channels.

43. A modular I-beam of claim 42 wherein the closure channel includes an upper plate and a lower plate and wherein the upper and lower plates are secured to the central beam.

44. A method of constructing a modular I-beam, said method comprising:

- a) forming a first set of nested channels;
- b) forming a second set of nested channels;
- c) disposing said first and second sets of nested channels in back-to-back relation to one another; and
- d) fastening said first and second sets of nested channels together.

45. The method of claim 44 wherein forming said first and second sets of nested channels comprises nesting an inner channel inside an outer channel to form at least one channel pair.

46. The method of claim 45 further comprising angling the top and bottom flanges of said inner channel outwardly from a midline of said inner channel to engage top and bottom flanges respectively of said outer channel.

47. The method of claim 44 wherein each said nested channel comprises a top flange, a bottom flange, and a central web connecting said top and bottom flanges.

48. The method of claim 47 further comprising bending an outer end portion of the top flange for at least one of said nested channels inwardly toward a midline of said channel to increase the strength of said modular I-beam.

49. The method of claim 48 further comprising bending an outer end portion of the top flange for each said nested channel inwardly toward a midline of said channel to increase the strength of said modular I-beam.

50. The method of claim 47 further comprising bending an outer end portion of said top and bottom flanges for at least one of said nested channels inwardly toward a midline of said channel to increase the strength of said modular I-beam.



51. The method of claim 44 further comprising:

- a) inserting a central beam between said first and second set of channels; and
- b) fastening said first and second sets of channels to said central beam.

5 52. The method of claim 51 further comprising:

- a) forming aligned openings in said nested channels;
- b) inserting said fasteners through said aligned openings to secure said first and second sets of nested channels to said central beam.

10 53. The method of claim 52 wherein said first and second sets of channels are fastened to said central beam by threaded fasteners.

15 54. The method of claim 52 wherein said first and second sets of channels are fastened to said central beam by nails.

20 55. The method of claim 52 wherein said first and second sets of channels are fastened to said central beam by screws.

25 56. The method of claim 44 further comprising:

- a) forming aligned openings in said nested channels;
- b) inserting said fasteners through said aligned openings to secure said first and second sets of nested channels together.

57. The method of claim 56 wherein said first and second sets of channels are fastened together by threaded fasteners that pass through said aligned openings in said nested channels.

58. The method of claim 44 including securing at least one member to the modular I-beam  
5 for permitting joists to be flush-mounted to the member.

59. The method of claim 44 including extending a plate outwardly of one of the first and second sets of channels such that joists can be flush mounted to the plate.

60. The method of claim 44 including extending a support structure around one of said first or second sets of channels such that the support structure may be utilized to mount joists thereto.

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